

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/13/2008 has been entered.

### ***Status of the Claims***

Claims 1-5 and 8-15 are pending in application, wherein claims 1 and 13 has been amended and claims 14 and 15 is added as new claims.

### ***Status of the Previous Rejections***

Previous rejections of claims 1-5 and 8-13 under U.S.C. 103(a) are withdrawn in view of the applicants' amendment marked 5/13/2008 to the claims. However, upon further consideration, a new ground(s) of rejection is made as address following.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 5, 8-9, and 14-15 are rejected under 35 U.S.C. 102(b) as anticipated by Cupertino et al (US Re 36,118, thereafter US'118).

Regarding claim 1, US'118 teaches a method for separating a metal selected from the group of magnesium, copper, titanium, iron, zinc from an organic complex thereof (Col.1, lines 8-10 of US'118). US'118 teaches applying a chelating ring resin to extract the metal from the aqueous solution in the form of a complex of the metal and the extractant (Col.1, lines 11-19 and examples 3-6 of US'118), which reads on the method of removal impurities by contact an aqueous with a chelating ion-exchange resin and removing the metal impurities from said solution using said chelating ion-exchange resin. US'118 teaches applying strong chloride solution on the Cu-included aqueous solution (Col.5, lines 5-11, and Example 4 of US'118). Though US'118 does not specify the copper in monovalent, because the copper solution reacts with strong chloride solution, the monovalent copper as recited in the instant claim would have been inherently present in the aqueous solution of US'118. MPEP 2112 III&IV.

Regarding claim 5, US'118 teaches the method including metal complexed with an organic complexing agent capable of

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being stripped with an aqueous acid, which includes zinc, lead, iron, or manganese (Col.4, line 60 to Col.5, line 4 of US'118), which is the same metals as recited in the instant claim.

Regarding claim 8, US'118 teaches the aqueous solution with pH value of 2.0. US'118 further teaches Fe is concentrated in the organic phase, which reads on the limitation of the metal impurities is carried out in an acidic environment as claimed in the instant claim.

Regarding claim 9, US'118 teaches the metal is obtained in weakly acid aqueous solution so that it can be precipitated, for example as the hydroxide or oxide, by neutralization of the small amount of acid with a small amount of alkali (Col.2, lines 1-7 of US'118), which reads on the limitation of removal of metal impurities is carried out in a neutral environment as recited in the instant claim.

Regarding claims 14 and 15, US'118 teaches a method comprises treating the complex with a weakly acid aqueous solution of an alkali metal or alkaline earth metal chloride having a chloride content of at least 4 molar and an acid strength of up to 0.5 molar above the stoichiometric requirement for stripping the metal the metal whereby said complex is decomposed and metal ions are transferred to the aqueous

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solution (Claim 1 of US'118, 4 molar NaCl is about 232g/l and 0.5 molar copper is about 32g/l—noted by examiner, also refer to the example 4 of US'118). US'118 further teaches higher concentrations favor more complete extraction of impurity metals but may reduce the selectivity with which they are extracted (Col.3, Line 38-44 of US'118). The Examiner notes the alkali chloride and copper contents ranges of US'118's solutions are within the claimed chloride and copper contents ranges as recited in the instant claims.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2-4 and 13 are rejected under 35 U.S.C. 103(a) as being obvious over US'118 in view of Partridge (US 6,165,367, thereafter US'367).

Regarding claims 2-4, US'118 teaches it is known in the arts that the organic complex is produced from an aqueous solution of metal salt with a chelating resin. This point is further evidenced by US'367. US'367 teaches a method for

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selectively removing a heavy metal from an aqueous waste streams and more particularly to methods for reducing the heavy metal content in the waste steam to sub-ppm level (Col.1, Line 5-9 of US'367). US'367 teaches: "...providing a chelating resin containing amino-phosphonic group for capturing the heavy metal ions..."; "...wherein the chelating resin is a styrene divinylbenzene copolymer..." (Claims 1-4 of US'367); US'367 teaches the resin' group can be "represented as:  $\text{-NH-CH}_2\text{-PO}_3\text{Na}_2$ " (Col.2, Line 22-37); and US'367 also tests "...a chelating resin with iminodiacetic acid functional group..." (Col.4, Line 38-41). Compared with the instant invention, US'367 overlaps the limitations related to chelating ion-exchange resin recited in the instant claims 2-4. The similar hydrometallurgical process to extract heavy impurities with the similar ion exchange resin renders prima facie obvious. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to choose a suitable ion-exchange resin as demonstrated in US'367 in the process of US'118.

Regarding claim 13, US'367 teaches "methods for selectively removing a heavy metal from an aqueous waste streams and more particularly to methods for reducing the heavy metal content in the waste steam to sub-ppm level." (Col.1, Line 5-9, this metal impurity level is compatible with the level that recited by

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instant invention—refer to the instant claim 12). This means it would have been obvious to one of ordinary skill in the art to get “cathode copper LME-A grade copper” as demonstrated in US’367 in the process of US’118.

Claims 10-12 are rejected under 35 U.S.C. 103(a) as being obvious over US’118 in view of Hyvarinen et al (US 6,007,600, thereafter US’600).

Regarding claim 10 and 11, US’118 teaches the metal is obtained in weakly acid aqueous solution so that it can be precipitated, for example as the hydroxide or oxide, by neutralization of the small amount of acid with a small amount of alkali. The mother liquor from the precipitation can then be readjusted to weak acidity and re-used for further stripping cycles (Col.2, lines 1-7 of US’118). US’118 does not specify the detail process for applying NaCl and alkaline solutions. US’600 teaches: “...a countercurrent leaching of a sulfidic copper material, such as chalcopyritic copper concentrate, in a chloride milieu, so that the obtained product is essentially iron-free alkali chloride-copper chloride solution, where the copper is mainly monovalent...” (Col.2, Line 44-67 and also refer to Fig.1-3). US’600 shows “...the leaching is performed into a circulating NaCl solution...” (Col.3, Line 35-46 and refer to

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Fig.1-3). US'600 also teaches: "The precipitation is carried out by means of sodium hydroxide..." (Col.4, Line 3-19, refer to Fig. 1-3 step 13). US'600 teaches the similar hydrometallurgical processes applying on the same copper-contained solution as recited in the instant invention. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to choose suitable NaCl and NaOH treatment in operation as demonstrated in US'600 in the process of US'118 because US'600 teaches the copper by hydrometallurgical chloride processes has the chance to make use of a lower degree of oxidation (Col.2, Line 33-39 of US'600).

Regarding claim 12, which depends on claim 11, US'118 in view of US'600 teaches the limitation of claim 11. US'118 further teaches different metals (Fe, Ni, Zn, Cu) reacted with different strip solutions (A= 0.5 molar HCl; B= 0.5 Molar HCl +2.75 molar CaCl<sub>2</sub>) in example 4 (Col.7, Line 6-43 of US'118). The concentration levels of Fe, Ni and Zn in the aqueous phase after reacted with strip solution are less than 500 ppm (1ppm = 1 mg/L for H<sub>2</sub>O— noted by examiner). This concentration range overlaps the limitation as recited in the instant claim.

***Response to Arguments***

Applicant's arguments filed on 5/13/2008 have been fully considered but they are not persuasive. See above rejections.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jie Yang whose telephone number is 571-2701884. The examiner can normally be reached on IFP.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-2721244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JY  
/Roy King/  
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